

*Department of Communication, University of Teramo*

**wp.comunite.it** ●●●○○○

### **The macroeconomics of social pacts.**

Nicola Acocella  
Giovanni Di Bartolomeo  
Patrizio Tirelli

*Department of Communication, Working Paper No 28*

### **Department of Communication Working Paper Series.**

The Department of Communication Working Paper Series is devoted to disseminate works-in-progress reflecting the broad range of research activities of our department members or scholars contributing to them. It is aimed at multi-disciplinary topics of humanities, science and social science and is directed towards an audience that includes practitioners, policymakers, scholars, and students. The series aspires to contribute to the body of substantive and methodological knowledge concerning the above issues. Since much of the research is ongoing, the authors welcome comments from readers; we thus welcome feedback from readers and encourage them to convey comments and criticisms directly to the authors.

Working papers are published electronically on our web site and are available for free download (<http://wp.comunite.it>). Each working paper remains the intellectual property of the author. It is our goal to preserve the author's ability to publish the work elsewhere. The paper may be a draft that the author would like to send to colleagues in order to solicit comments or feedback, or it may be a paper that the author has presented or plans to present at a conference or seminar, or one that the author(s) have submitted for publication to a journal but has not yet been accepted.

# The macroeconomics of social pacts\*

Nicola Acocella

University of Rome “La Sapienza”

Giovanni Di Bartolomeo

University of Teramo

Patrizio Tirelli

University of Milan-Bicocca

November, 2007

## Abstract

In this paper we analyze macroeconomic interactions between trade unions, the central bank and the fiscal policymaker. We explicitly model unions’ concern for public expenditure, paving the way for an analysis of the potential gains from cooperation between the fiscal policymaker and the unions, i.e. the so-called corporatist or social pacts that have characterized economic policies in a number of European countries in the last few decades. We also highlight the profoundly different incentives generated by institutional arrangements such as the Maastricht criteria and the Stability and Growth Pact. The former has unambiguously induced more efficient outcomes; the latter is likely to backfire!

**Jel:** E42, E58, E61, E62, E64, H30, J51, J58.

**Keywords:** Corporatism, trade unions, fiscal policy, monetary conservativeness, policy game.

## 1 Introduction

In this paper we analyze macroeconomic interactions among trade unions, the central bank and the fiscal policymaker. We explicitly model trade unions’

---

\*Nicola Acocella and Giovanni Di Bartolomeo acknowledge financial support from the University of Rome “La Sapienza.” Patrizio Tirelli acknowledges financial support from MIUR 60% and MIUR 40% 2004. This research project has been also supported by a Marie Curie Transfer of Knowledge Fellowship of the European Community’s Sixth Framework Program under contract number MTKD-CT-014288.

concern for public expenditure, paving the way for an analysis of the potential gains from cooperation between the fiscal policymaker and the trade unions, i.e. the so-called corporatist or social pacts that have characterized economic policies in a number of European countries in the last few decades. Following Burda (1997), we define corporatism as a set of rules of the game, i.e. institutional arrangements that involve negotiation, bargaining, collaboration, and accord between major economic groupings in a society, and especially between unions and governments. Thus corporatism provides the commitment technology necessary to enforce cooperative agreements between the trade unions and the fiscal policymaker.

In their golden age (the 1970s and early 1980s) social pacts sought to trade wage moderation for higher public expenditure (namely welfare expenditure) or lower inflation (namely after the oil shocks).<sup>1</sup> Earlier empirical studies pointed out that corporatist economies post better performance in terms of inflation and unemployment (Calmfors and Driffill, 1988) but higher levels of taxation. In recent decades there have been rather conspicuous changes in European industrial relations. Since 1987, when the first of five multi-annual pacts was stipulated in Ireland, there have been numerous formal or informal agreements of a corporatist nature in almost all European countries, with the major exceptions of Belgium and France. But the social pacts of the last fifteen years differ from earlier ones in at least one important respect, since they establish reductions – rather than increases – in public expenditure and government action to protect employment and labor rights (Regini, 1997; Visser, 2002). Some contributions (Streek, 1998; Hancké and Rhodes, 2005) suggest that second-generation social pacts were induced by the need to meet the Maastricht criteria. Hancké and Rhodes (2005) also point out that social pacts disappeared after 1999.

We revisit the case for corporatist agreements in a model where labor markets are unionized, the government controls the fiscal stance, and an independent central bank sets monetary policy. We can then analyze the scope for a political exchange between public expenditure and wage setting choices, showing that corporatism may generate quite different macroeconomic outcomes from the traditional exchange between wage restraint and high public expenditure. In fact our model can easily encompass both first and second-generation corporatist agreements.

Our approach stands in sharp contrast with some contributions where the importance of institutional arrangements in shaping macroeconomic out-

---

<sup>1</sup>Unionized labor markets and a pervasive welfare system have long been the hallmark of European corporatist economies (OECD, 1997; Traxler and Kittel, 2000; Rhodes, 2001; van Poeck and Borghijs, 2001).

comes is a key ingredient, but the focus is restricted to unilateral institutional constraints on policymakers. Typically, central bank conservatism and institutional constraints on fiscal discretion are deemed to generate lower output distortions and inflation (see, for instance, Beetsma and Bovenberg (1998) and Beetsma and Uhlig, 1999). These results are obtained neglecting strategic interactions between non-atomistic wage setters and policymakers. In this paper we reconsider the issue and show that trade unions differentially react to institutional arrangements such as the Maastricht criteria and the Stability and Growth Pact, SGP henceforth. To the extent that unions saw benefits from joining EMU, the conditionality of the Maastricht criteria favored agreements that disciplined wage claims and public expenditures, whereas the unilateral fiscal *commitment* implied by the SGP apparently wipes off incentives for virtuous social pacts and is likely to have adverse effects on wage setting behavior.

The paper is organized as follows. In section 2 we present our model. In section 3 we derive the non-cooperative solution. In section 4 we compare the outcomes of cooperative and non-cooperative regimes and derive a number of propositions on the desirable effects of social pacts. In section 5 we explain the shifts from first to second-generation social pacts, with particular emphasis on the potential role of the Maastricht Treaty. Section 6 highlights the dangers of unilateral fiscal retrenchments such as the SGP. Section 7 concludes.

## 2 The model

The standard supply function is defined as follows<sup>2</sup>

$$x = \pi - \pi^e - t - \tilde{x} \quad (1)$$

where output deviations from the competitive non-distortionary baseline level,  $x$ , are caused by an index of tax distortions,  $t$ , real wage distortions due to monopolistic unions,  $\tilde{x}$ ,<sup>3</sup> and inflation surprises,  $\pi - \pi^e$  ( $\pi^e$  defines inflation expectations).

In this economy there are three players: the government, a monopoly trade union, and the central bank.

The government's loss function is defined over inflation, output and public

---

<sup>2</sup>Equation (1) is akin to Alesina and Tabellini (1987) and Beetsma and Bovenberg (1998). For a derivation, see Appendix A.

<sup>3</sup>More precisely,  $\tilde{x}$  is the real wage mark-up over the competitive wage rate.

expenditure deviations from the target,  $g - \tilde{g}$ :

$$G = \frac{1}{2} \{ \alpha_{\pi f} \pi^2 + x^2 + \alpha_{gf} (g - \tilde{g})^2 \} \quad (2)$$

As in Debele and Fischer (1994),  $\tilde{g}$  is interpreted as the optimal share of non-distortionary output to be spent on public goods if non-distortionary lump-sum taxes were available. In setting the public expenditures level, the government faces a balanced budget constraint:<sup>4</sup>

$$g = t \quad (3)$$

The trade union's loss function is

$$U = -\tilde{x}\beta_{\tilde{x}} + \frac{x^2}{2} + \frac{\beta_{gu}(g - \tilde{g})^2}{2} \quad (4)$$

The union's welfare increases with the real wage but falls with output distortions (see Lawler, 2000a, 2000b; Cukierman, 2004).<sup>5</sup> The assumption that the trade union is concerned with expenditure deviations from the target is perhaps less straightforward and requires some discussion. In fact union members may be concerned with specific components of public expenditures, such as pension funds, training schemes, unemployment benefits, health insurance for workers, social policies, labor policy, and any government action in the area of income distribution. For simplicity, we can say that the union is interested in the level of total government expenditure. In addition, we assume that the monopolistic union sets the labor market distortion, i.e. a real-wage mark-up over the competitive rate. If we accept a social welfare perspective of the government's preferences, the loss functions (2) and (4) will differ insofar as the government takes the preferences of non-workers into account (as in Beetsma and Bovenberg, 1998).<sup>6</sup>

Monetary policy is delegated to an independent central bank (CB henceforth), which is interested in minimizing both the inflation rate and output deviations from a non-distortionary equilibrium.

$$V = \frac{1}{2} \{ \alpha_{\pi m} \pi^2 + x^2 \} \quad (5)$$

where  $\alpha_{\pi m} > \alpha_{\pi f}$ . We assume that the CB directly controls the inflation rate.

---

<sup>4</sup>For the sake of simplicity we abstract from both the seigniorage component of the budget and debt service payments.

<sup>5</sup>In the literature it is sometimes assumed that the union penalises real wage deviations from an exogenous real wage target. This would cause minor changes in our results. See Acocella and Di Bartolomeo (2004) for a discussion on the different specifications of the union loss function.

<sup>6</sup>For the sake of simplicity we assume that the public expenditure targets in eq. (2) and (4) are identical.

### 3 The non-cooperative solution

The timing of the game is as follows. The union and the government simultaneously set labor and tax distortions. After that, the CB chooses monetary policy. The model is solved by backward induction. In Appendix C we extend our results to the case where the government action follows the union wage-setting decision. A graphical characterization of the Stackelberg equilibrium is provided below (figures 1-3).

The CB's reaction function is easily derived from equation (5):

$$\pi = \frac{1}{1 + \alpha_{\pi m}} \{\pi^e + t + \tilde{x}\} \quad (6)$$

Taking account of the balanced budget constraint (3) the government first order condition is

$$\alpha_{\pi f}(\pi) \frac{\partial \pi}{\partial t} + x \left( \frac{\partial x}{\partial t} + \frac{\partial x}{\partial \pi} \frac{\partial \pi}{\partial t} \right) + \alpha_{gf}(g - \tilde{g}) = 0 \quad (7)$$

where  $\frac{\partial x}{\partial t} + \frac{\partial x}{\partial \pi} \frac{\partial \pi}{\partial t} = -1 + \frac{1}{(1 + \alpha_{\pi m})}$

When choosing the fiscal stance, the government anticipates the CB's reaction to its tax policy, such that inflation will increase following a rise in the tax rate. However, the government cannot internalize the simultaneous reaction of the trade union. Thus, as explained in Beetsma and Bovenberg (1998), taxes will be set *as if* the inflation response could partly offset output distortions, neglecting the wage-setting reaction to taxation.

Let us now turn to union's behavior. The log-deviation of the nominal wage from its competitive zero-inflation level is  $w = \tilde{x} + \pi^e$  (for a derivation, see Appendix A). We assume that the trade union takes  $g$  as given and simultaneously chooses inflation expectations and the level of  $\tilde{x}$ , where the latter minimizes (4).<sup>7</sup> By imposing rational expectations  $\pi^e = \pi$  (i.e.  $\partial x / \partial \tilde{x} = -1$ ), we obtain the trade union first order condition:

$$-\beta_{\tilde{x}} - x = 0 \quad (8)$$

---

<sup>7</sup>This implies that the union bargains over the real wage. In the literature it is sometimes assumed that unions bargain over the nominal wage. This issue is not relevant here because, as Lippi (2002) shows, the two assumptions may have different implications only if the number of unions is greater than one.

Corresponding Nash outcomes are:

$$x^N = -\beta_{\tilde{x}} \quad (9)$$

$$\tilde{x}^N = \beta_{\tilde{x}} \left[ 1 + \frac{1}{\alpha_{gf}} \left( \frac{\alpha_{\pi f} + \alpha_{\pi m}^2}{\alpha_{\pi m} + \alpha_{\pi m}^2} \right) \right] - \tilde{g} \quad (10)$$

$$(\tilde{g} - g^N) = \frac{\beta_{\tilde{x}}}{\alpha_{gf}} \left( \frac{\alpha_{\pi f} + \alpha_{\pi m}^2}{\alpha_{\pi m} + \alpha_{\pi m}^2} \right) \quad (11)$$

$$\pi^N = \frac{\beta_{\tilde{x}}}{\alpha_{\pi m}} \quad (12)$$

Output distortions are policy invariant (see eq. (9)): given the tax rate, the trade union will set the real wage distortion at a level such that (8) holds. As a consequence, labor and tax distortions are perfect substitutes: the output effect of a tax change is fully offset by a real wage adjustment in the opposite direction (see eq. (10)). We cannot rule out the case where the government chooses to subsidize production ( $g^N < 0$ ). In this case the union neutralizes the effects of a subsidy by increasing labor distortions. The more the union is concerned with the real wage objective, the lower is the tax rate (eq. (11)). Our results stand in sharp contrast with those obtained in models where labor market distortions are exogenous. First of all, these models see subsidies as a remedy to labor market distortions (Alesina and Tabellini, 1987; Dixit and Lambertini, 2003). In fact, instead of raising production, our model shows that the expectation of a subsidy would trigger a real wage increase. Second, the expenditure bias identified in Beetsma and Bovenberg (1998) has no impact on output distortions, which are independent of fiscal policy.

## 4 The cooperative solution

The Nash equilibrium implies three sources of inefficiency related to the timing of the game and the existence of externalities. First, the government cannot internalize the impact of its actions on inflation expectations. Second, the government does not internalize the real wage reaction, such that in equilibrium  $\frac{\partial x}{\partial t} = 0$ . Third, the trade union neglects the adverse effects of its actions on the level of public expenditure.

As usual, cooperation is defined as the joint minimization of a convex combination of the difference between the two players' loss functions and their outside options, i.e. the generalized Nash product  $(G - G^N)^\phi (U - U^N)^{(1-\phi)}$  with  $\phi \in [0, 1]$ . For our purposes, a graphical analysis is exhaustive.



To begin with, it is useful to identify the two players' preferred combination of expenditure gap and output.<sup>8</sup> For the government, this is:

$$\tilde{g} - g^{GSB} = \frac{\alpha_{\pi m}^2 \alpha_{gf}}{\alpha_{\pi f} + \alpha_{\pi m}^2 (1 + \alpha_{gf})} \tilde{g} \quad (13)$$

$$x^{GSB} = -\frac{\alpha_{gf} \alpha_{\pi m}^2}{\alpha_{\pi f} + \alpha_{\pi m}^2 (1 + \alpha_{gf})} \quad (14)$$

Conditions (13) and (14) imply that  $\tilde{x} = 0$ . Moreover, they are obtained by requiring the policymaker to take into account the adverse effect of taxes on inflation expectations.

The trade union's preferred combination of expenditure gap and output is:

$$(\tilde{g} - g^{USB}) = \frac{\beta_{\tilde{x}}}{\beta_{gu}} \quad (15)$$

$$x^{USB} = x^N = -\beta_{\tilde{x}} \quad (16)$$

$g^{USB}$  is determined by the union desired trade-off between public expenditures and the real wage. Note that the Nash equilibrium leads to a level of output too low for the government, i.e.  $x^{GSB} > x^N$ , but we cannot say *a priori* what is the relative magnitude of  $(\tilde{g} - g^{GSB})$ ,  $(\tilde{g} - g^{USB})$ ,  $(\tilde{g} - g^N)$ .

For our analysis of social pacts, it is useful to distinguish the following cases:

$$(\tilde{g} - g^{USB}) < (\tilde{g} - g^N) \quad (17)$$

$$(\tilde{g} - g^{USB}) > (\tilde{g} - g^N) \quad (18)$$

irrespectively of the relative size of  $g^{GSB}$ .

Suppose condition (17) holds. Both the government and the union benefit from  $(\tilde{g} - g^C) < (\tilde{g} - g^N)$ , where superscript  $C$  identifies cooperative outcomes. In figure 1, the loci  $RG$  and  $RU$  identify the combinations of output distortions and expenditure gap that obtain along the two players' reaction functions, and points  $\Sigma$ ,  $\Omega$  define the outcomes<sup>9</sup> preferred by the government and by the trade union respectively (their second-best outcomes). Points

<sup>8</sup>See Appendix B for a derivation.

<sup>9</sup>Note that point  $\Sigma$  must lie above the locus  $RG$  because in  $\Sigma$  the government internalizes the adverse effect of taxes on inflation expectations and chooses a lower level of public expenditure (see Appendix B for a discussion).

$N$  and  $S$  identify the Nash and Stackelberg equilibria. With regard to the Stackelberg equilibrium, it is worth noting that the union now internalizes the trade off between the real wage mark-up and public expenditure. Therefore its ability to commit to a real wage distortion leads to a better economic performance relative to the Nash equilibrium. Further benefits accrue from cooperation. In fact cooperative equilibria, e.g. point  $C$  in figure 1,<sup>10</sup> entail a reduction both in output distortions and the public expenditure gap. This, in turn, implies that the trade union is willing to discipline wage claims in order to benefit from an increase in expenditure.

Figure 1

Suppose condition (18) holds. Both the Stackelberg and the cooperative solutions are then substantially modified (see figure 2). With regard to the Stackelberg equilibrium, the union's ability to internalize the trade off between the real wage mark-up and public expenditure causes an increase in output distortions relative to the Nash equilibrium. This happens because the trade union is now less interested in public expenditures. By contrast, cooperation brings output distortions below the Nash equilibrium.

Figure 2

Summarizing, our model is consistent with both the old and the new forms of social pacts. Any cooperative agreement entails a reduction in output distortions and an increase in employment. If  $(\tilde{g} - g^{USB}) < (\tilde{g} - g^N)$ , the government will agree to reduce the public expenditure gap (i.e., it will raise public expenditure) in exchange for wage moderation as in the golden age social pacts. By contrast, if  $(\tilde{g} - g^{USB}) > (\tilde{g} - g^N)$ , the government agrees on a reduction in public expenditure, as all cooperative solutions must lie in the feasibility set indicated in figure 2.

## 5 Explaining the shift from first- to second-generation social pacts

According to our model, the observed shift to second-generation pacts is possible only if condition (18) holds, that is, if

---

<sup>10</sup>We take the Nash non-cooperative equilibrium as the players' outside option of the cooperative Nash solution in figure 1. When the union is the game leader with respect to the government, the feasibility set has to be computed by considering the Stackelberg solution as the outside option

$$\frac{\beta_{\tilde{x}}}{\beta_{gu}} > \frac{\beta_{\tilde{x}}}{\alpha_{gf}} \frac{\alpha_{\pi f} + \alpha_{\pi m}^2}{\alpha_{\pi m} + \alpha_{\pi m}^2} \quad (19)$$

In the light of eq. (19) we can discuss the potential role of some facts which might have influenced the evolution of social pacts.

- *Fall in union militancy.* There is evidence that union militancy began to fall in the 80s (see Visser, 2000), potentially disciplining wage claims and inducing the unions to accept a reduction in public expenditure. In our model parameter  $\beta_{\tilde{x}}$  characterizes union militancy; hence from (19) it is clear that this would not change the nature of the political exchange between the unions and the policymaker.
- *Political change.* In many European countries right-wing governments came to power in the early Nineties (Swank, 1999). Furthermore, Piazza (2001) argues that the remaining left-wing governments became less radical, partly due to the generalized fall in union militancy. This could have reduced governments' concern for public expenditures and thus one of the terms of social pacts. In our framework variations in  $\alpha_{gf}$ <sup>11</sup> can capture the impact of the political cycle on the nature of social pacts. It is easy to see that a fall in  $\alpha_{gf}$ , i.e. a political shift to the right, *per se* makes condition (19) less likely to obtain.
- *Central Bank commitment to low inflation.* There is a widespread consensus (e.g. Clarida *et al.*, 1998) that in the 80s Central Banks adopted a more conservative stance. In our model, the monetary policy reaction to fiscal and labour market distortions affects the fiscal policymaker decision to levy distortionary taxes. As discussed in section 3, this is the Beetsma and Bovenberg effect, captured by changes in  $\alpha_{\pi m}$ . From condition (19), it is easy to see that an increase in conservatism can reduce  $(\tilde{g} - g^N)$  only if  $\alpha_{\pi m} < \alpha_{\pi f} + \sqrt{\alpha_{\pi f}^2 + \alpha_{\pi f}}$ .<sup>12</sup>
- *Maastricht criteria.* Second-generation social pacts became more numerous in the early 1990s, after stipulation of the Maastricht Treaty,

---

<sup>11</sup>Alternatively, we might assume that the government is characterized by a relatively lower public expenditure target. The results would be qualitatively identical.

<sup>12</sup>The non linear effect of a change in  $\alpha_{\pi m}$  is explained as follows. On the one hand, according to the Beetsma and Bovenberg effect, the government anticipates an accommodating monetary response on output. Therefore an increase in conservatism disciplines expenditures. On the other hand, the accommodating monetary policy response has an adverse effect on inflation. Therefore an increase in conservatism lowers the inflation costs of higher public expenditures.

when admission to EMU was made conditional to fulfilment of certain prerequisites entailing monetary policy independence, inflation control and fiscal discipline. It is widely acknowledged that the Treaty enhanced the low-inflation commitment of many European central banks and disciplined governments. A similar conclusion should hold for wage-setting behavior, to the extent that unions members saw benefits from EMU.<sup>13</sup> Assuming that this was indeed the case and that the Maastricht criteria acted as an incentivating rule, in the following we investigate whether trade union attitude towards EMU membership can explain second-generation social pacts.

In our framework the role of the Maastricht criteria is mimicked by adding linear penalties in inflation and public expenditure <sup>14</sup> to (2), (4):

$$G = \frac{1}{2} \{ \alpha_{\pi f} \pi^2 + x^2 + \alpha_{gf} (g - \tilde{g})^2 \} + \alpha_{\pi}^{EU} \pi + \alpha_{gu}^{EU} g \quad (20)$$

$$U = -\tilde{x} \beta_{\tilde{x}} + \frac{x^2}{2} + \frac{\beta_{gu} (g - \tilde{g})^2}{2} + \beta_{\pi}^{EU} \pi + \beta_{gu}^{EU} g \quad (21)$$

Equation (4) captures the idea that the trade union saw benefits from joining the monetary union and that they internalized the link between wage setting behavior, fulfillment of the Maastricht criteria and the chances of accession to EMU.<sup>15</sup>

Solving the model for the Nash equilibrium yields:

$$x^{NMA} = x^N + \frac{\beta_{\pi}^{EU}}{\alpha_{\pi m}} \quad (22)$$

$$\tilde{x}^{NMA} = \tilde{x}^N - \left( 1 + \frac{\alpha_{\pi f} + \alpha_{\pi m}^2}{\alpha_{gf} (\alpha_{\pi m} + \alpha_{\pi m}^2)} \right) \frac{\beta_{\pi}^{EU}}{\alpha_{\pi m}} + \frac{\alpha_{\pi}^{EU}}{\alpha_{gf} (1 + \alpha_{\pi m})} + \frac{\alpha_{gu}^{EU}}{\alpha_{gf}} \quad (23)$$

---

<sup>13</sup>Consider for instance the welfare gains outlined in the Cecchini report (see Cecchini, 1988). For an alternative justification see Whyman (2002).

<sup>14</sup>The Maastricht criteria required public deficit control. To the extent that this put pressure for a reduction in public spending, in our static framework it seems appropriate to assume that this raised the cost of attaining a certain level of public expenditure. Buti (2006) shows that "several countries combined discretionary cuts in spending with a reduction in tax revenue, thus reducing the overall size of the public sector" (Buti, 2006, p.7).

<sup>15</sup>It is sometimes assumed that the union cares about inflation *per se*. This is a debated issue since it is considered as an *ad hoc* assumption by many authors (e.g. Soskice and Iversen, 2000). Here, the inclusion of inflation has a different nature. Unions care about inflation to support the entrance in the monetary union.

$$\tilde{g} - g^{NMA} = (\tilde{g} - g^N) + \frac{1}{\alpha_{gf}} \left[ \frac{\alpha_{\pi}^{EU}}{1 + \alpha_{\pi m}} + \alpha_{gu}^{EU} - \frac{\beta_{\pi}^{EU}}{\alpha_{\pi m}} \frac{\alpha_{\pi f} + \alpha_{\pi m}^2}{\alpha_{\pi m} + \alpha_{\pi m}^2} \right] \quad (24)$$

$$\pi^{NMA} = \pi^N - \frac{\beta_{\pi}^{EU}}{\alpha_{\pi m}^2} \quad (25)$$

The Nash equilibrium is now characterized by a fall in output distortions and inflation. Trade union's concern for EMU membership is crucial to support this result:  $x^{NMA} = x^N$  and  $\pi^{NMA} = \pi^N$  when  $\beta_{\pi}^{EU} = 0$ .<sup>16</sup> Without cooperation, the Maastricht criteria have an ambiguous impact on the public expenditure gap (eq. 24): on the one hand, the fiscal stance is tighter because the policymaker sees more costs from increases in inflation and public expenditures; on the other hand, trade unions are induced to choose a smaller level of output distortions for any level of public expenditures (see eq. (22)), and greater wage discipline leaves room for a looser fiscal policy.

By contrast, the effect of the Maastricht criteria on the trade union's preferred expenditure gap is unambiguously positive:

$$(\tilde{g} - g^{USBMA}) = (\tilde{g} - g^{USB}) + \frac{\beta_{gu}^{EU}}{\beta_{gu}} \quad (26)$$

Following the Maastricht Treaty, cooperative agreements would take the form of second-generation pacts only if  $(\tilde{g} - g^{USBMA}) > \tilde{g} - g^{NMA}$ . This, in turn, requires that

$$\frac{\beta_{gu}^{EU}}{\beta_{gu}} + \frac{1}{\alpha_{gf}} \left[ \frac{\beta_{\pi}^{EU}}{\alpha_{\pi m}} \frac{\alpha_{\pi f} + \alpha_{\pi m}^2}{\alpha_{\pi m} + \alpha_{\pi m}^2} - \frac{\alpha_{\pi}^{EU}}{1 + \alpha_{\pi m}} - \alpha_{gu}^{EU} \right] > - [(\tilde{g} - g^{USB}) - (\tilde{g} - g^N)] \quad (27)$$

where it is obviously assumed that (17) holds, i.e.  $[(\tilde{g} - g^{USB}) - (\tilde{g} - g^N)] < 0$ .

The l.h.s. of (27) identifies the differential impact that the Maastricht criteria have on  $(\tilde{g} - g^{USBMA})$  and  $\tilde{g} - g^{NMA}$ , confirming the intuition that second-generation pacts would have emerged only if the Maastricht criteria had a relatively strong impact on trade unions.<sup>17</sup> Note that if in eq. (24)

<sup>16</sup>In the Nash equilibrium coefficient  $\beta_{gu}^{EU}$  in (21) is obviously irrelevant. It would play an important role when the trade union plays Stackelberg leader vis à vis the government.

<sup>17</sup>This conclusion is reinforced for countries where commitment to low inflation and fiscal discipline had already been established. For instance, when  $\alpha_{\pi m} \rightarrow \infty$  condition (27) requires  $\frac{\beta_{gu}^{EU}}{\beta_{gu}} > \frac{\alpha_{gu}^{EU}}{\alpha_{gf}}$ .

the expenditure gap falls, i.e.  $\left[ \frac{\beta^{EU}}{\alpha_{\pi m}} \frac{\alpha_{\pi f} + \alpha_{\pi m}^2}{\alpha_{\pi m} + \alpha_{\pi m}^2} - \frac{\alpha_{\pi}^{EU}}{1 + \alpha_{\pi m}} - \alpha_{gu}^{EU} \right] > 0$ , then condition (27) is more likely to hold. This leads to an intriguing and perhaps surprising conjecture. Without cooperation, the Maastricht criteria might have failed to discipline fiscal policies even though both unions and fiscal policymakers recognized the importance of joining EMU. This, in turn, led to the emergence of social pacts aiming at public expenditure control.

## 6 The danger of unilateral fiscal retrenchments: Could the SGP backfire?

Earlier contributions (see Sibert, 1999; Sibert and Sutherland, 2000) have pointed out that, while policymakers were unambiguously disciplined by the conditionality of the Maastricht Treaty, national fiscal policies would turn to a loose stance after EMU membership was obtained, unless additional constraints were imposed on the fiscal policymakers. Moreover, an extensive literature supports the view that institutional constraints on the fiscal stance improve macroeconomic performance,<sup>18</sup> providing a rationale for the Stability and Growth Pact. In these contributions trade unions' behavior is usually neglected or assumed to be exogenous. In this section we show that such an assumption is not innocuous.

Our analysis is based on the presumption that Maastricht criteria and the SGP have a profoundly different influence on the trade union incentives. As discussed in section 5, the former leave room for wage setting decisions to affect outcomes – EMU membership – of interest to trade unions. By contrast, the latter are unilateral decisions undertaken by governments, who promise to adopt a certain fiscal stance independently from wage-setting behavior. Furthermore, the recent history of EMU fiscal policies shows that the costs of breaching the SGP rules are mainly reputational and therefore fall entirely on the fiscal policymakers. We therefore assume that the unions objective function (4) is not affected by fiscal precommitment.

The SGP defines deficit ceilings. As pointed out in section 5 it seems plausible that deficit control ultimately translates into lower expenditures. In the following we maintain the assumption that administrative restrictions on the fiscal stance are bound to limit the level of public expenditures. In our model this is equivalent to establishing a floor  $G$  for the government's

---

<sup>18</sup>See, among others, Chari and Kehoe (1997), Beetsma and Bovenberg (1998, 2000, 2002), Beetsma and Uhlig (1999), Dixit (2001), Dixit and Lambertini (2001), and Gornatori and Eijffinger (2003).

reaction function, such that  $\tilde{g} - g \geq G$ .<sup>19</sup> Consider a Nash equilibrium (eq. (9)). It is easy to see that setting  $G > \tilde{g} - g^N$  would trigger a real wage increase, leaving output distortions unaffected.<sup>20</sup> Therefore fiscal constraints always reduce welfare.

A more complex picture emerges if one considers the case where unions act as a leader *vis à vis* the fiscal policymaker (figure 3).

Figure 3

First, consider the case of an  $S_1$ -type equilibrium characterized by  $\tilde{g} - g^{S_1}$ . It is easy to see that any  $G < \tilde{g} - g^{S_1}$  would not bind. By contrast, for any  $G > \tilde{g} - g^{S_1}$  the constraint is binding but counterproductive. Second, consider an  $S_2$ -type equilibrium. The floor is only binding for any  $G > \tilde{g} - g^{S_2}$ , where output distortions fall to the Nash equilibrium level. This happens because the union no longer anticipates the trade off between wage distortion and public expenditure gap. However, a commitment to *raise* expenditures would exert an identical disciplining effect on the union, but with a lower expenditure gap! In fact, the optimal constraint is a *ceiling* on the public expenditure gap, such that  $G^{ceil} = \max\{0, \tilde{g} - \beta_{\tilde{x}}\}$ .<sup>21</sup>

## 7 Concluding remarks

The impact of endogenous wage setting on macroeconomic performance cannot be neglected in European countries. We have also shown that cooperation between the unions and the governments can improve economic performance and the positions of the parties. The first key to our results lies in the consideration that, in addition to the traditional objectives, i.e. the real wage rate and employment, unions may be interested in the level of public expenditure. The second key lies in our re-examination of corporatism as a feasible set of institutional arrangements designed to internalize certain negative macroeconomic externalities. The third key is the characterization of the government budget as a two-faced Janus, i.e. its double role of providing public expenditure valuable for union members and extracting distortionary taxes. The fourth key is the emphasis on the profoundly different incentives

---

<sup>19</sup>Alternatively, we might assume that, as in section 5, not fulfilling the SGP requirement affects the fiscal policymaker's objective function. Our results would not be affected, because the crucial assumption is the differential impact of the two schemes on the unions objective function.

<sup>20</sup>As an example, consider point  $P$  in figure 3.

<sup>21</sup>It would be straightforward to show that this result obtains minimizing the Government loss function subject to the constraints  $x = -\beta_{\tilde{x}}$  and  $\tilde{x} \geq 0$ .

generated by institutional arrangements such as the Maastricht criteria, on the one hand, and the SGP, on the other. This latter result is entirely due to our endogeneization of the wage setting process.

Our analysis has significant implications for the current debate on institutional reforms in Europe. Discussion of the reform of the Stability and Growth Pact fails to consider its impact on labor market performance. Our paper suggests that when the interdependence between fiscal policy and the labor market is considered, any strategy of unilaterally placing a cap on public expenditure is doomed to be counterproductive. In one case a commitment to raise expenditures would even be preferable to a restrictive ceiling! By contrast, corporatist institutions should be regarded as valuable tools in enhancing macroeconomic performance, in line with the Lisbon Strategy approach, which emphasizes the role of social partnership.

Some authors see the commitment to fiscal restraint as a catalyst for labor market reforms that should reduce the power of unions. In this vein, the complete liberalization of the labor market would be a complementary solution to the Stability and Growth Pact. However, the risks should be clear. On the one hand, the Calmfors and Driffill hump-shape curve suggests that corporatist agreements are likely to dominate partial labor market liberalization. On the other hand, complete deregulation may be politically unfeasible.

## Appendix A – Derivation of output equation

The representative price-taking firm maximizes its net profit:

$$P(1 - \tau)Y - WL \quad (\text{A1})$$

where  $Y = L^a$  is the production function,  $P$  and  $W$  respectively define the price and wage levels, and  $\tau$  is the sales-tax rate.

The standard first order condition is:

$$P(1 - \tau)\alpha L^{a-1} = W \quad (\text{A2})$$

The next step is the definition of the nominal wage rate which obtains in a unionized labour market:

$$W = W^C (1 + \mu^U) P^e \quad (\text{A3})$$

where  $W^C$  is the exogenous real wage that would be obtained in a competitive labour market,  $(1 + \mu^U)$  defines the real wage mark-up over the competitive



rate,  $P^e$  is the expected price level.<sup>22</sup> Taking logs, we get

$$y = \frac{a}{1-a} [p - t - w^c - \tilde{x} - p^e] + \frac{a}{1-a} \ln a \quad (\text{A4})$$

where  $\tilde{x} = \ln(1 + \mu^U)$ ,  $t = -\ln(1 - \tau)$ . Defining  $\bar{y} = \frac{a}{1-a} (-w^c + \ln a)$  as the non-distorted real output, and normalizing at 1 the previous period price level, we can rewrite the above equation as:

$$x = (\pi - \pi^e - \tilde{x} - t) \quad (\text{A5})$$

where  $x = \left(\frac{a}{1-a}\right)^{-1} (y - \bar{y})$

To derive the government balanced budget equation (3) start from

$$\tau Y = GEXP \quad (\text{A6})$$

where  $GEXP$  defines the level of government expenditures. Straightforward manipulations show that

$$(1 - \tau) = \left(1 - \frac{GEXP}{Y}\right) \quad (\text{A7})$$

Hence, setting  $g = -\ln\left(1 - \frac{GEXP}{Y}\right)$ , equation (3) obtains.

## Appendix B – Figure outcomes

In this appendix we derive the iso-losses and reaction functions depicted in the figures (i.e. in the space  $(x, g - \tilde{g})$ ).

The union's iso-loss curves are directly obtained from equation (4) by using (1), (3) and the rational expectations constraint:

$$U = \beta_{\tilde{x}}(x + g) + \frac{x^2}{2} + \frac{\beta_{gu}(g - \tilde{g})^2}{2}$$

The government's iso-loss is:

$$G(x, g - \tilde{g}) = \frac{1}{2} \left\{ \left( \frac{\alpha_{\pi f}}{\alpha_{\pi m}^2} + 1 \right) x^2 + \alpha_{gf} (g - \tilde{g})^2 \right\}$$

and its reaction function is:

$$\tilde{g} - g = -\frac{\alpha_{\pi f} + \alpha_{\pi m}^2}{(1 + \alpha_{\pi m}) \alpha_{\pi m} \alpha_{gf}} x$$

---

<sup>22</sup>In this class of models wages are pre-determined w.r.t. prices; thus nominal wages are set conditionally to the price level expectation.

since  $\frac{\partial x}{\partial g} = \frac{\partial \pi}{\partial t} - 1 = \frac{1}{1+\alpha_{\pi m}} - 1 = -\frac{\alpha_{\pi m}}{1+\alpha_{\pi m}}$ .

The union's preferred combination of output and expenditure gap is:

$$\Omega = \left\{ -\beta_{\tilde{x}}, \frac{\beta_{\tilde{x}}}{\beta_{gu}} \right\}$$

Similarly for the government we obtain:

$$\bar{\Sigma} = \{0, \tilde{g}\}$$

which is however unfeasible since it implies  $\tilde{x} = -\tilde{g}$ . By considering the additional constraint  $\tilde{x} \geq 0$  (i.e.  $\tilde{g} - g > x + \tilde{g}$ ), the government's preferred combination of outcomes and expenditure gap is:

$$\Sigma = \left\{ -\frac{\alpha_{gf}\alpha_{\pi m}^2}{\alpha_{\pi f} + \alpha_{\pi m}^2(1 + \alpha_{gf})}\tilde{g}, \frac{\alpha_{\pi m}^2\alpha_{gf}}{\alpha_{\pi f} + \alpha_{\pi m}^2(1 + \alpha_{gf})}\tilde{g} \right\}$$

implying a labor distortion equal to zero ( $\tilde{x} = 0$ ). It is easy to verify that  $\Sigma$  lays above the government's reaction function. This happens for reasons discussed in the text.

## Appendix C – Stackelberg solution

The non-cooperative Stackelberg solution is derived as follows. From (1), (6), (7) we obtain the fiscal policymaker's reaction function

$$t = \frac{\alpha_{gf}(1 + \alpha_{\pi m})^2 \tilde{g} - (\alpha_{\pi f} + \alpha_{\pi m}^2)(\tilde{x} + \pi^e)}{\alpha_{\pi m}^2 + \alpha_{\pi f} + (1 + \alpha_{\pi m})^2 \alpha_{gf}}$$

Imposing rational expectations, it is then straightforward to show that the trade union's loss function (4) is minimized by

$$\tilde{x} = \frac{[\alpha_{\pi f} + \alpha_{\pi m}^2 + \alpha_{gf}\alpha_{\pi m}(1 + \alpha_{\pi m})][\alpha_{\pi f} + \alpha_{\pi m}^2 + \alpha_{gf}(1 + \alpha_{\pi m})^2]}{\alpha_{\pi m}^2\alpha_{gf}(1 + \alpha_{\pi m})^2 + \beta_{gu}(\alpha_{\pi m}^2 + \alpha_{\pi f})^2}\beta_{\tilde{x}} - \tilde{g}$$

The corresponding equilibrium outcomes (point  $S$  in the figures) are:<sup>23</sup>

$$\begin{aligned} t &= \tilde{g} - \frac{(\alpha_{\pi f} + \alpha_{\pi m}^2) [\alpha_{\pi f} + \alpha_{\pi m}^2 + \alpha_{gf} (1 + \alpha_{\pi m})^2]}{\alpha_{\pi m} \alpha_{gf}^2 (1 + \alpha_{\pi m})^3 + \beta_{gu} (\alpha_{\pi m}^2 + \alpha_{\pi f})^2} \beta_{\tilde{x}} \\ \pi &= \frac{(1 + \alpha_{\pi m}) [(1 + \alpha_{\pi m})^2 \alpha_{gf} + \alpha_{\pi m}^2 + \alpha_{\pi f}] \alpha_{gf}}{\alpha_{\pi m} \alpha_{gf}^2 (1 + \alpha_{\pi m})^3 + \beta_{gu} (\alpha_{\pi m}^2 + \alpha_{\pi f})^2} \beta_{\tilde{x}} \\ x &= - \frac{(1 + \alpha_{\pi m}) [(1 + \alpha_{\pi m})^2 \alpha_{gf} + \alpha_{\pi m}^2 + \alpha_{\pi f}] \alpha_{\pi m} \alpha_{gf}}{\alpha_{\pi m} \alpha_{gf}^2 (1 + \alpha_{\pi m})^3 + \beta_{gu} (\alpha_{\pi m}^2 + \alpha_{\pi f})^2} \beta_{\tilde{x}} \end{aligned}$$

## References

- Acocella, N. and G. Di Bartolomeo (2004), “Non-neutrality of monetary policy in policy games,” *European Journal of Political Economy*, 20: 695-707.
- Alesina, A. and G. Tabellini (1987), “Rules and discretion with noncoordinated monetary and fiscal policies,” *Economic Inquiry*, 25: 619-630.
- Beetsma, R.M.W.J. and A.L. Bovenberg (1998), “Monetary union without fiscal coordination may discipline policymakers,” *Journal of International Economics*, 45: 239-258.
- Beetsma, R.M.W.J. and A.L. Bovenberg (2000), “Designing fiscal and monetary institutions for a European Monetary Union,” *Public Choice*, 102: 247-269.
- Beetsma, R.M.W.J. and A.L. Bovenberg (2002), “Strategic debt accumulation in a heterogeneous monetary union,” *European Journal of Political Economy*, 19: 1-15.
- Beetsma, R.M.W.J. and H. Uhlig (1999), “An analysis of the Stability and Growth Pact,” *The Economic Journal*, 109: 546-571.
- Buti, M. (2006), “Will the new Stability and Growth Pact succeed? An economic and political perspective,” *European Economy*, 241 January.
- Burda, M.C. (1997), “Corporatism, labor unions and the safety set,” *European Economic Review*, 41(3-5): 635-646.

---

<sup>23</sup>It is worth noting that the output distortion associated with the Nash equilibrium is smaller than that associated with the Stackelberg solution if  $\frac{\beta_{gu}}{\alpha_{gf}} < \frac{\alpha_{\pi m}^2 + \alpha_{\pi m}}{\alpha_{\pi m}^2 + \alpha_{\pi f}}$ . Thus central bank’s preferences affect output distortions. In a companion paper we analyze the optimal degree of conservativeness under Nash and Stackelberg equilibria.

- Calmfors, L. and J. Driffill (1988), "Bargaining structure, corporatism and macroeconomic performance," *Economic Policy*, 6: 14-61.
- Cecchini, P. (1988), *The European challenge 1992. The benefits of a single market*, Aldershot, Wildwood House.
- Chari, V.V. and P.J. Kehoe (1997), "On the need for fiscal constraints in a monetary union," Working Paper Number No. 589, Federal Reserve Bank of Minneapolis.
- Clarida, R. H., J. Gali, and M. Gertler (1998) "Monetary Policy Rules in Practice: Some International Evidence," *European Economics Review*, 42: 1033-1068.
- Cukierman, A. (2004), "Monetary institutions, monetary union and unionized labor markets – Some recent developments," *Monetary policy, fiscal policies and labour markets: Key aspects of macroeconomic policymaking in EMU*, edited by Beetsma, R., C. Favero, A. Missale, V.A. Muscatelli, P. Natale, and P. Tirelli, Cambridge University Press, Cambridge.
- Debelle, G. and S. Fischer (1994), "How independent should a central bank be?," *Goals, guidelines, and constraints facing a policymakers*, edited by Furher J., Federal Reserve Bank of Boston, Conference Series No. 38.
- Dixit, A. (2001), "Monetary-fiscal policy interactions and commitment versus discretion in a monetary union," *European Economic Review*, 45: 977-987.
- Dixit, A. and L. Lambertini (2001), "Games of monetary and fiscal interactions in the EMU," *European Economic Review*, 45: 589-613.
- Dixit, A. and L. Lambertini (2003), "Interactions of commitment and discretion in monetary and fiscal policy," *American Economic Review*, 93(5).
- Governatori, M. and S. Eijffinger (2003), "Fiscal and monetary policy interaction: An analysis of the Stability and Growth Pact with symmetric and asymmetric countries," mimeo, Tilburg University, November.
- Hancké, B. and M. Rhodes (2005), "EMU and Labor Market Institutions in Europe: The Rise and Fall of National Social Pacts," *Work and Occupations*, 32: 2, May 2005, pp. 196-228.
- Hughes-Hallett, A. and D. N. Weymark (2007), "Fiscal leadership and central bank design," *Canadian Journal of Economics*, 40: 607-627

- Lawler, P. (2000a), "Centralised wage setting, inflation contracts, and the optimal choice of central banker," *Economic Journal*, 110: 559-75.
- Lawler, P. (2000b), "Union wage setting and exchange rate policy," *Economica*, 67: 91-100.
- Lippi, F. (2002) "Revisiting the case for a populist central banker," *European Economic Review*, 46: 601-612.
- OECD (1997), "Economic performance and structure of collective bargaining," *Employment Outlook*, OECD, Paris: 63-92.
- Piazza J. (2001), "De-linking labor. Labour unions and social democratic parties under globalization," *Party Politics*, 7: 413-435.
- Regini, M. (1997), "Still engaging in corporatism? Recent Italian experience in a comparative perspective," *European Journal of Industrial Relations*, 3.
- Rhodes, M. (2001), "The political economy of social pacts: 'Competitive corporatism' and European welfare reform" in *The new politics of the welfare state* edited by Pierson P., Oxford University Press, Oxford: 165-194.
- Sibert, A. (1999), "Monetary integration and economic reform," *Economic Journal*, 109: 78-92.
- Sibert, A. and S. Sutherland (2000), "Monetary union and labor market reform," *Journal of International Economics*, 51: 421-436.
- Soskice, D. and T. Iversen (2000), "The nonneutrality of monetary policy with large price or wage setters," *Quarterly Journal of Economics*, 115: 265-284.
- Streeck, W. (1998). "The internationalization of industrial relations in Europe: Prospects and problems," *Politics & Society*, 26: 429-459.
- Swank, D. (1999), "Pooled time series data base on the comparative political economy of advanced capitalist democracies," electronic data base, Marquette University.
- Traxler, F. and B. Kittel (2000), "The bargaining system and performance: A comparison of 18 OECD countries," *Comparative Political Studies*, 33: 1154-1190.

- van Poeck, A. and A. Borghijs (2001), "EMU and labour markets reform: Needs, incentives and realisations," *The World Economy*, 24: 1327-1352.
- Visser, J. (2000), "From Keynesianism to the third way: Labour relations and social policy in Western Europe", *Economic and Industrial Democracy*, 21: 421-456.
- Visser, J. (2002), "Unions, wage bargaining and co-ordination in European labour markets," in *Wage policy in the Eurozone*, edited by Pochet P., P.I.E. Peter Lang, Brussels.
- Whyman, P. (2002), "British trade unions and economic and monetary union," *Industrial Relations*, 41: 467-476

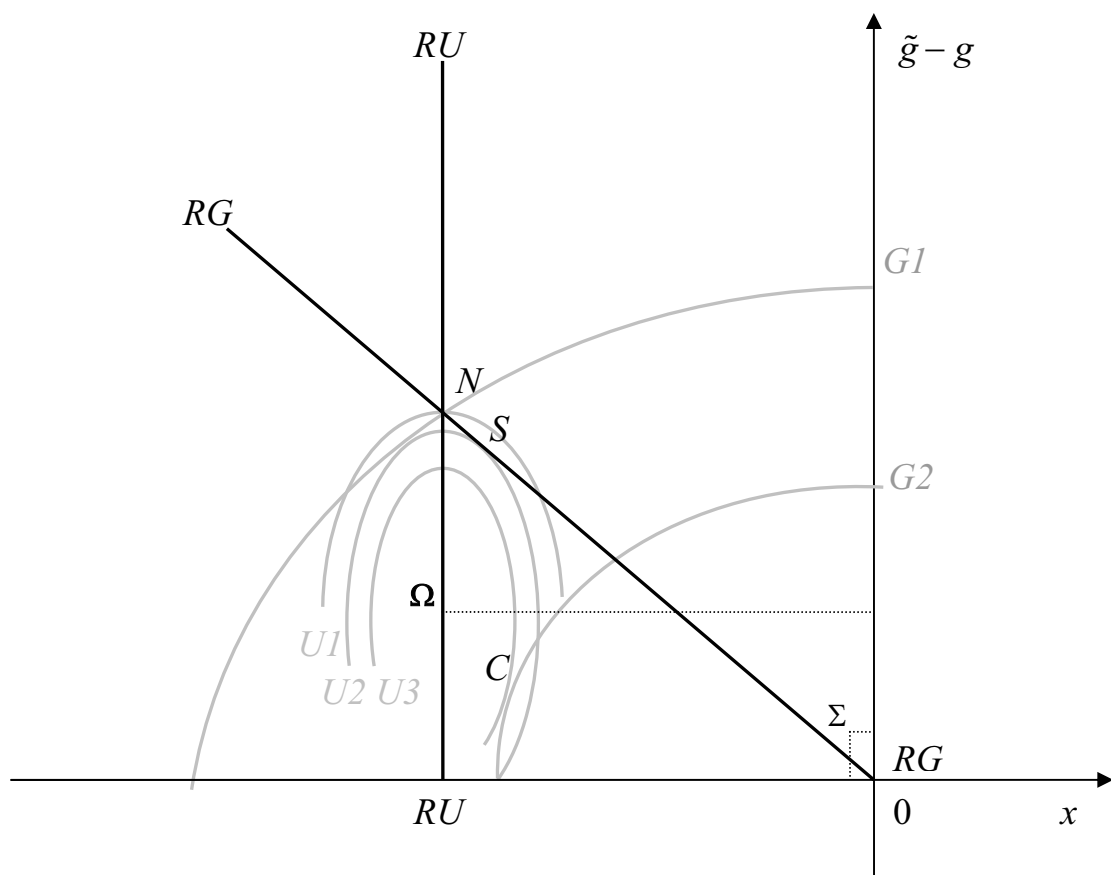


Figure 1

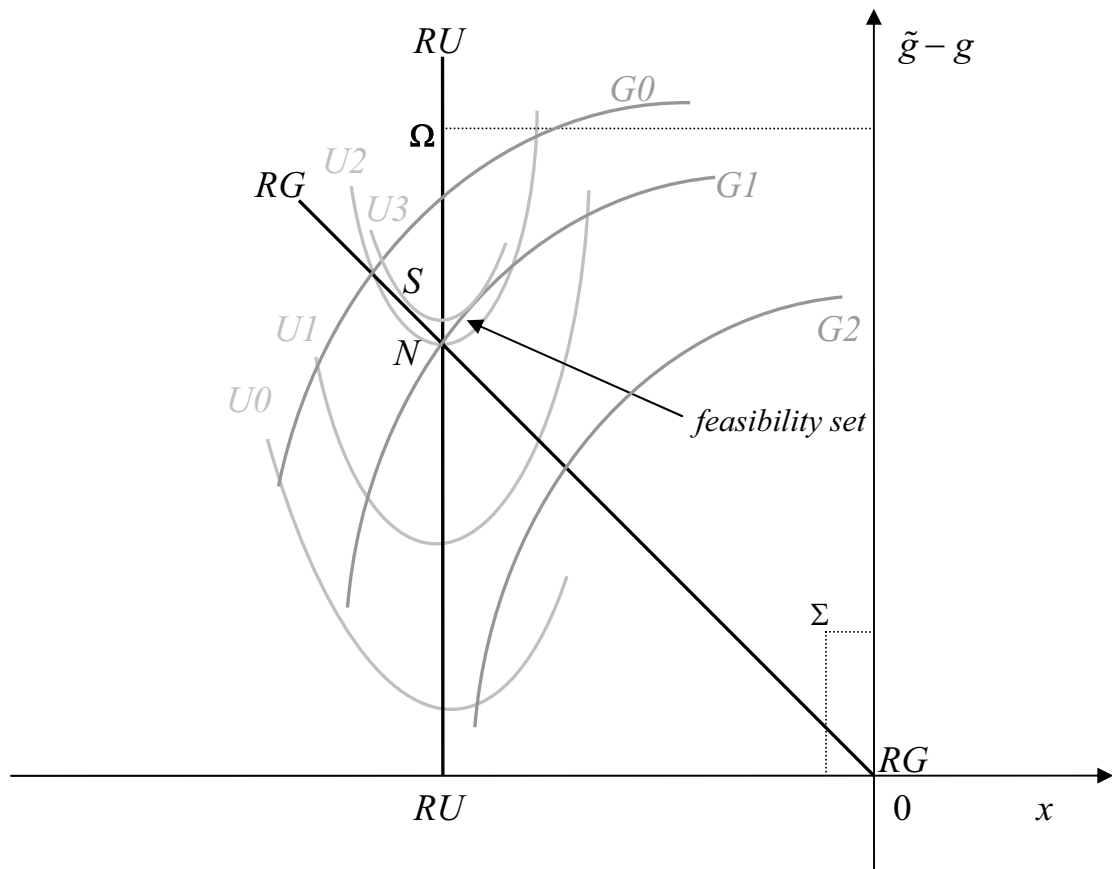


Figure 2



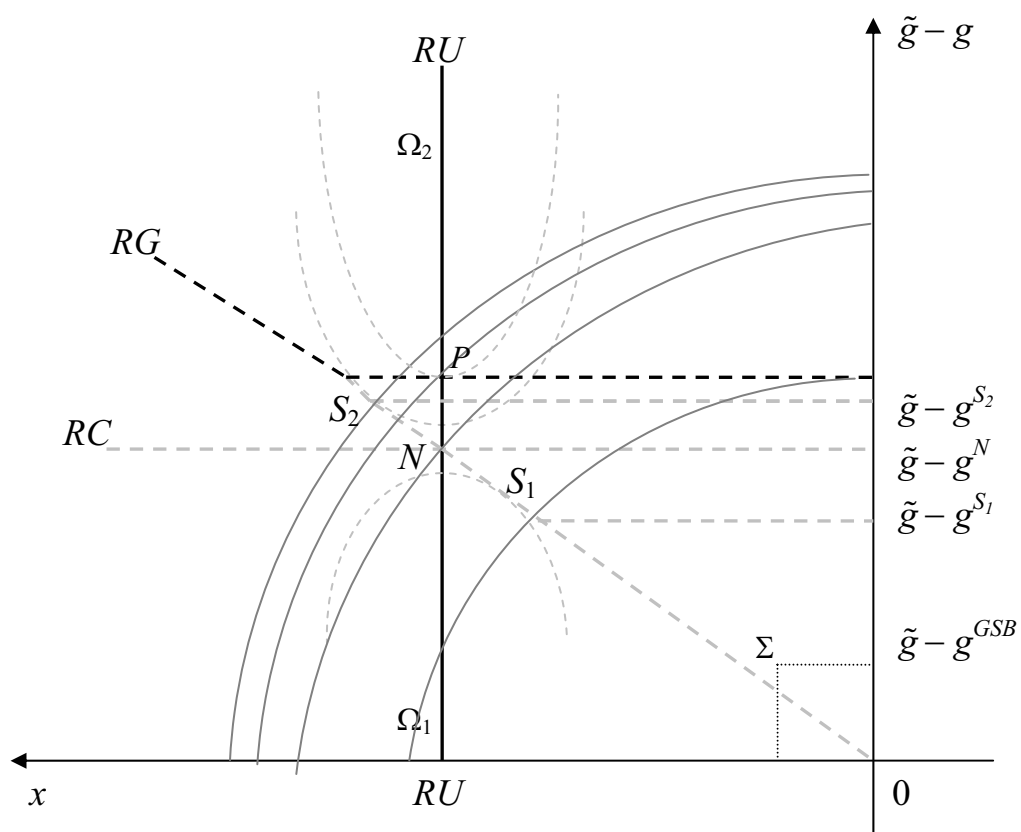


Figure 3